

Claims

1. A method of determining whether a test subject has, or is at risk of developing, a titin-related disease or condition, said method comprising analyzing a nucleic acid molecule of a sample from the test subject to determine whether the
5 test subject has a mutation in a *titin* gene, wherein the presence of said mutation is an indication that said test subject has, or is at risk of developing, a titin-related disease.
2. The method of claim 1, further comprising the step of using nucleic acid
10 molecule primers specific for the *titin* gene for nucleic acid molecule amplification of the *titin* gene by the polymerase chain reaction.
3. The method of claim 1, further comprising the step of sequencing *titin*
nucleic acid molecules from said test subject.
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4. The method of claim 1, wherein said test subject is a mammal.
5. The method of claim 1, wherein said test subject is human.
- 20 6. The method of claim 1, wherein said disease or condition is heart failure.
7. The method of claim 1, wherein said mutation is the *pickwick* mutation.

8. A method for identifying a compound that can be used to treat or to prevent heart failure, said method comprising contacting an organism comprising a *titin* mutation and having a phenotype characteristic of heart failure with said compound, and determining the effect of said compound on said phenotype,
5 wherein detection of an improvement in said phenotype indicates the identification of a compound that can be used to treat or to prevent heart failure.

9. The method of claim 8, wherein said organism is a zebrafish.

10 10. The method of claim 8, wherein said *titin* mutation is the *pickwick* mutation.

11. A method of treating or preventing heart failure in a patient, said method comprising administering to said patient a compound identified using the
15 method of claim 8.

12. The method of claim 11, wherein said patient has a mutation in the *titin* gene.

20 13. The method of claim 12, wherein said mutation is the *pickwick* mutation.

14. A non-human animal comprising a mutation in a *titin* gene.

25 15. The non-human animal of claim 14, wherein the non-human animal is a zebrafish.

16. The non-human animal of claim 14, wherein the mutation is in a cardiac-specific exon of said *titin* gene.

17. The non-human animal of claim 16, wherein the mutation is in the N2B
5 exon of said *titin* gene.

18. The non-human animal of claim 14, wherein the mutation results in the presence of a stop codon in said *titin* gene.

10 19. The non-human animal of claim 14, wherein the mutation is the *pickwick* mutation.